<u>Claims</u>

1   1.   A method comprising

2   identifying a hierarchy position in a space

3 defined by a hierarchy of nodes, the space having at least

4 two dimensions, each node being uniquely identifiable within

5 the space by values in the respective dimensions, including

6 a node level identifying the node's hierarchy level and a

7 node-in-level identifying the node uniquely among nodes in

8 that level,

9   the hierarchy position being identified by position

10 values in the dimensions that are different from the node

11 level and the node-in-level.

1   2.   The method of claim 1 in which one of the

2 position values comprises a depth value in the form of a

3 non-integral number.

1   3.   The method of claim 1 in which one of the

2 position values comprises a position-in-level value in the

3 form of a non-integral number.

1   4.   The method of claim 3 in which the position-

2 within-level value comprises a node-in-value level

3 identifying one node plus a floating-point number

4 representing an offset of the position from that node.

1   5.   The method of claim 1 further comprising

2   using the hierarchy position to identify a focus of

3 a user's view of the hierarchy.

1   6.   A method comprising

2   displaying representations of nodes of a hierarchy

3 in a space on a display, each node representation fully

4 occupying a subspace within the space, and

5   allocating the space entirely to the subspaces.

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7.   The method of claim 6 in which the nodes are
organized in levels in the hierarchy and the space is
allocated among the levels so that one level is fully
represented in a dimension of the display that corresponds
to changing levels and the levels of the hierarchy above and
below the one level are at least partially represented.

8.   The method of claim 7 in which each of the
levels is represented as a band in the space, nodes
represented in one band have a parent-child relationship
with nodes represented in an adjacent band, and within a
band space is allocated so that the subspace of a parent has
the same dimension along the band as the sum of the
dimensions of its children along the adjacent band.

9.   A method comprising
for a node in a hierarchy of nodes,
    rendering a container associated with the node and
    a representation of information associated with the
    node, the container having dimensions that change
    with an amount of space dynamically allocated to the
    node based on a changing focus in the hierarchy, the
    representation having unchanging dimensions,
    drawing the container and the representation on a
display, and when the focus changes,
        re-rendering the container with updated dimensions
        and drawing the container on the display,
    and, without re-rendering, copying the rendered
    representation to a new location.

10.   The method of claim 9 in which the drawn
container indicates the node's position in the hierarchy and
its relationship to nearby nodes.

11.   The method of claim 10 in which the
representation includes graphics or text or both.

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1   12.   A method comprising
2   receiving information indicating a displacement of a
3   user input device within a two-dimensional frame of
4   reference,
5   translating displacement in at least one of the
6   dimensions to a rate of change of a hierarchy position used
7   to identify a focus of a user's view of the hierarchy.
1   13.   The method of claim 12 in which one dimension
2   represents a depth in the hierarchy and the other dimension
3   represents position-within-level.
1   14.   The method of claim 12 in which one dimension
2   represents a level depth in the hierarchy and the other
3   dimension represents position-within-level.
1   15.   A method comprising
2   displaying a representation of a portion of a
3   hierarchy of nodes to a user,
4   associating with each node an action to be performed
5   by an application, the action being other than navigation of
6   the hierarchy, and enabling a user to navigate in the
7   displayed representation of the portion of the hierarchy by
8   a first type of action, and
9   enabling a user to trigger the action associated
10   with a displayed node of the hierarchy by invoking the node
11   using a second type of action.
1   16.   The method of claim 15 in which the first
2   type of action comprises dragging.
1   17.   The method of claim 15 in which the second
2   type of action comprises clicking.

18.   A method comprising

displaying a representation of a portion of a hierarchy of nodes,

providing an emulation of a return-to-center input device for enabling a user to navigate the hierarchy,

in response to the user manipulating a non-return-to-center input device to indicate an intended manipulation of the emulation for navigating the hierarchy, treating the user's manipulation as a manipulation of the return-to-center input device.

19.   The method of claim 18 in which the non-return-to-center input device comprises a computer mouse, trackball, or pad.

20.   The method of claim 18 in which the return-to-center input device comprises a joystick.

21.   The method of claim 18 in which the emulation includes rendering the device on a display.

22.   The method of claim 18 in which the response to the user manipulation is to change a focus position in the hierarchy.

23.   The method of claim 22 in which the focus position is changed by periodically adding a focus increment vector to a focus position, the focus increment vector being a function of the vector by which the emulated controller is displaced.

24.   The method of claim 18 in which the user manipulating the non-return-to-center controller in a single dragging action enables the user to view an arbitrarily large hierarchy of nodes.

25.   The method of claim 23 in which the function is nonlinear to permit the user to vary navigation velocity over a wide two-dimensional range.

26.   A method comprising

at a client device, displaying information about a portion of a hierarchy of nodes including a node at the top of a sub-hierarchy of the hierarchy,

as a user's navigation causes sub-hierarchies to approach view in the displayed information, fetching, from a server, information about the sub-hierarchy that is approaching view.

27.   A method comprising

receiving at a server a request from a client for a hierarchy definition,

in response to the request, providing to the client a portion but not all of the hierarchy definition, the portion referencing other portions of the hierarchy.

28.   The method of claim 27 in which each of the portions comprises a sub-hierarchy.

29.   The method of claim 27 further comprising determining the size of the portion to be provided to the client adaptively based on parameters for optimizing communication between the server and the client.

30.   The method of claim 27 in which the server automatically builds a hierarchy definition portion that is as near as possible in size to a given minimum portion size.

31.   The method of claim 27 in which the server generates references to sub-hierarchies and includes them with definitions of nodes of the portion provided.

32.   A web page comprising

an area that provides a navigational interface that permits continuous navigation of a hierarchy of nodes.

33.   The web page of claim 32 in which the nodes comprise links to other web pages.

34.   A web browser component comprising
software that provides a user interface window that
permits continuous navigation of a hierarchy of nodes.

35.   The component of claim 34 in which the nodes
comprise links to web pages.

36.   The component of claim 35 in which the window
occupies less than 25% of the web page.

37.   A user interface comprising
a device that permits continuous navigation of a
hierarchy for selecting from a hierarchy.

38.   The user interface of claim 37 in which the
hierarchy comprises a hierarchical function menu.

39.   The user interface of claim 37 in which the
hierarchy comprises a hierarchical file system.

40.   The user interface of claim 37 in which the
hierarchy comprises a document encoded in XML or an
extension thereof.

41.   The user interface of claim 37 in which the
hierarchy comprises a hierarchical index constructed from a
document, list, or table.

42.   The user interface of claim 37 in which the
hierarchy comprises an encoded hierarchy.

43.   The user interface of claim 37 in which the
encoded hierarchy comprises the Dewey Decimal System.

44.   The user interface of claim 37 in which the
hierarchy comprises categorized products.

45.   The user interface of claim 37 in which the
hierarchy comprises postal addresses or other location by
geographic region.

46.   The user interface of claim 37 in which the
hierarchy comprises characters belonging to a character set
to be selected for text entry.

1   47.   The user interface of claim 37 in which the
2 hierarchy comprises a corpus which is not hierarchical in
3 its native form and upon which hierarchy has been imposed
4 using a similarity-seeking technology.

1   48.   A method comprising
2   displaying a portion of a hierarchy at a browser,
3   enabling a user to navigate continuously through
4 levels and nodes of the hierarchy, and
5   during navigation delivering portions of the
6 hierarchy from a remote server to the browser in time to
7 enable the continuous navigation.